

# ADVANCED WARNING OPERATIONS COURSE REFERENCES

## Core Decision Making Track

### IC Core 1: Optimizing Learning

#### Lesson 1: Optimizing Learning

##### References

Clark, R.C., 1998: Building Expertise: Cognitive Methods for Training and Performance Improvement. International Society for Performance Improvement, Washington D.C.

Hahn, Bianka B., D. W. Klinger, 2004: Advanced Warning Operations: Collaborative Development of Expertise Workshop. Klein Associates. (Work funded by OCWWS, Warning Decision Training Branch).

Hodges, T. K., 2002: Linking Learning to Performance: A Practical Guide to Measuring Learning and On-The-Job Application. Butterworth-Heinemann, Boston, MA.

Hopkins, K. D., 1998: Educational and Psychological Measurement and Evaluation. Allyn and Bacon, Boston, MA.

Kirkpatrick, D. L., 1994: Evaluating Training Programs: The Four Levels. Berrett-Koehler, San Francisco, CA. (note: Kirkpatrick first published his four-level approach on the evaluation of training in a series of articles appearing in the journal known as the American Society of Training Directors in November-December of 1959 and January-February 1960.)

McCain, D. V. and D. D. Tobey, 2004: Facilitation Basics. American Society for Training and Development, Alexandria, VA.

Phillips, J. J., 1991: Handbook of Training Evaluation and Measurement Methods. Gulf Publishing Company, Houston, TX.

Stanard, T., R. M. Pliske, A. A. Armstrong, S. Green, C. E. Zsombok, D. P. McDonald, B. W. Crandall, 2002: Collaborative Development of Expertise: Evaluation of an On-The-Job (OJT) Training Program. Proceedings, Human Factors and Ergonomics Society 46<sup>th</sup> Annual Meeting, Baltimore, MD 2002

<http://pro.sagepub.com/content/46/25/2007>

Stolovitch, H. D., E. J. Keeps, 2003: Telling Ain't Training. American Society for Training and Development, Alexandria, VA.

[http://books.google.com/books?id=TXdBTMoRvVUC&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](http://books.google.com/books?id=TXdBTMoRvVUC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

Zsombok, C E., 1995: High performance OJT: New Power for the World of Work. Klein Associates. (Work funded by the US Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA MDA903-93-C-0092)

## **IC Core 2: Situational Awareness and Decision Making in a Warning Environment**

### **Lesson 1: The Warning Process and the Role of Intuition**

### **Lesson 2: Individual SA**

### **Lesson 3: Team SA**

### **Lesson 4: SA Demons: The Enemies of Situation Awareness**

#### **References**

Endsley, M. R., 1988: Design and Evaluation for Situational Awareness Enhancement. *Proceedings of the Human Factors Society, 32<sup>nd</sup> annual meeting, Santa Monica, CA*, **32**, 97-101.

<http://www.mendeley.com/catalog/design-evaluation-situation-awareness-enhancement-4/>

Endsley, M. R., 1995: Toward a theory of situation awareness in dynamic systems. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, **37**, 32–64.

<http://hfs.sagepub.com/content/37/1/32>

Endsley, M., B. Bolte, D. Jones, 2003: Designing for Situation Awareness. Taylor & Francis, 333 pp.

[http://books.google.com/books/about/Designing\\_for\\_Situation\\_Awareness.html?id=tIhAWzumdMC](http://books.google.com/books/about/Designing_for_Situation_Awareness.html?id=tIhAWzumdMC)

Klein, G., 1999: Source of Power: How People Make Decisions. Cambridge, MA: MIT Press, 348 pp.

<http://mitpress.mit.edu/books/sources-power>

Klein, G. 2002: Intuition at Work. Currency/Doubleday, 311 pp.

Prince, C.: Guidelines for Situation Awareness Training. NAWCTSD/UCF/FAA Partnership for Aviation Training, 82 pp.

[http://www.faa.gov/about/office\\_org/headquarters\\_offices/avs/offices/afs/afs200/branches/afs210/training\\_aids/media/saguides.doc](http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs200/branches/afs210/training_aids/media/saguides.doc)

Ragman, J. S. T., 2002: Defensive Driving. Wait, Make That Defensive Flying. *Flying Safety*, **58(5)**, p. 20.

<http://ehis.ebscohost.com/ehost/detail?sid=0bcd2d43-8004-4d4a-98e6-bbc26c972823%40sessionmgr104&vid=1&hid=109&bdata=JnNpdGU9ZWwhvc3QtbGl2ZQ%3d%3d#db=f5h&AN=6756202>

Railroad Accident Report Collision of Washington Metropolitan Area Transit Authority Train T-111 with Standing Train at Shady Grove Passenger Station, Gaithersburg, Maryland, January 6, 1996. National Transportation Safety Board, Adopted: October 29, 1996. 106 pp.

<http://www.nts.gov/doclib/reports/1996/RAR9604.pdf>

Salas, E., C. Prince, D. P. Baker, L. Shrestha, 1995: Situation Awareness in Team Performance: Implications for Measurement and Training. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, **37(1)**, 123-136.

[http://www.air.org/files/sit\\_awrns\\_teamprf.pdf](http://www.air.org/files/sit_awrns_teamprf.pdf)

Sullenburger, C., J. Zaslow, 2009: Highest Duty, My Search for What Really Matters. HarperCollins, 368 pp.

<http://www.harpercollins.com/browseinside/index.aspx?isbn13=9780061924682>

## **Lesson 5: Maintaining Situation Awareness by Managing the Unexpected**

### **References**

1<sup>st</sup> Air Force Headquarters (Briefing on 9/11). C-SPAN 11/30/2001

Advanced Warning Operations Course: Root Cause Analyses, 2005-2010. DOC/NOAA/NWS Warning Decision Training Branch.

Andra, David L., Elizabeth M. Quotone, William F. Bunting, 2002: Warning Decision Making: The Relative Roles of Conceptual Models, Technology, Strategy, and Forecaster Expertise on 3 May 1999. *Wea. Forecasting*, **17**, 559–566.

doi: [http://dx.doi.org/10.1175/1520-0434\(2002\)017<0559:WDMTRR>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2002)017<0559:WDMTRR>2.0.CO;2)

Bazerman, M. H. D. Chugh, 2006: Decisions Without Blinders. *Harvard Business Review*, **84(1)**, p. 88.

<http://hbr.org/2006/01/decisions-without-blinders/ar/1>

Hahn, B. B., E. Rall, D. W. Klinger, 2003: Cognitive Analysis of the Warning Forecaster Task. Klein Associates, Inc., Final Rep. RA1330-02-SE-0280, NOAA/NWS Office of Climate, Water, and Weather Services, 26 pp. [Available from Klein Associates, Inc., 1750 Commerce Center Blvd North, Fairborn, OH 45324-6362.]

<http://www.wdtb.noaa.gov/modules/CTA/Final123102rev030108.pdf>

Hammond, Ken. Managing the Risks of Organizational Accidents.

Johnson, Addie, 2004: We Learn from our Mistakes – Don't We? *Ergonomics in Design*, **12(2)**, 24-27

Klein, G. 2002: Intuition at Work. Currency/Doubleday, 311 pp.

Quotone, E. M., K. Huckabee, 1995: Anatomy of an Effective Warning: Event Anticipation, Data Integration, Feature Recognition. *14<sup>th</sup> Conference on Weather Analysis and Forecasting*, AMS, Dallas, pp. 420-425.

Ragman, J. T., 1999: Who is Watching You? *United States Air Force: Flying Safety Magazine*,

<http://www.docstoc.com/docs/92443226/JUNE-99-FSM>

Ragman, J. S. T., 2002: Defensive Driving. Wait, Make That Defensive Flying. *Flying Safety*, **58(5)**, p. 20.

<http://ehis.ebscohost.com/ehost/detail?sid=0bcd2d43-8004-4d4a-98e6-bbc26c972823%40sessionmgr104&vid=1&hid=109&bdata=JnNpdGU9ZWZWhvc3QtbGl2ZQ%3d%3d#db=f5h&AN=6756202>

Reason, James, 1990: Human Error. Cambridge University Press, 302 pp.

[http://books.google.com/books?id=WJL8NZc8lZ8C&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](http://books.google.com/books?id=WJL8NZc8lZ8C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

Russo, J. Edward, Paul J. H. Schoemaker, 1990: Decision Traps: Ten Barriers to Decision-making and How to Overcome Them. Simon and Schuster, 280 pp.

Sullenburger, C., J. Zaslow, 2009: Highest Duty, My Search for What Really Matters.

HarperCollins, 368 pp.

<http://www.harpercollins.com/browseinside/index.aspx?isbn13=9780061924682>

Warning Decision Making, 1: Survey Results 1997-98. DOC/NOAA/NWS Warning Decision Training Branch.

Weick, K. E., K. M. Sutcliffe, 2001: Managing the Unexpected: Assuring High Performance in an Age of Complexity. University of Michigan Business School Management Series. Jossey-Bass, 200 pp.

[http://www.amazon.com/Managing-Unexpected-Assuring-Performance-Complexity/dp/0787956279#reader\\_0787956279](http://www.amazon.com/Managing-Unexpected-Assuring-Performance-Complexity/dp/0787956279#reader_0787956279)

## **IC Core 3: Expertise and Effective Office Warning Strategies**

### **Lesson 1: Expertise**

#### **References**

Aviation Safety Network

<http://aviation-safety.net/index.shtml>

Hammond, Kenneth R., 1996: Human Judgment and Social Policy: Irreducible Uncertainty, Inevitable Error, Unavoidable Injustice. New York: Oxford University Press. 448 pp.

[http://books.google.com/books?id=Z\\_DZ3nKHq2cC&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](http://books.google.com/books?id=Z_DZ3nKHq2cC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

Klein, G., 1999: Source of Power: How People Make Decisions. Cambridge, MA: MIT Press, 348 pp.

<http://mitpress.mit.edu/books/sources-power>

Klein, G. 2002: Intuition at Work. Currency/Doubleday, 311 pp.

Pliske, R. M., D. Klinger, R. Hutton, B. Crandall, B. Knight, G. Klein, 1997: Understanding Skilled Weather Forecasting: Implications for Training and the Design of Forecasting Tools (Technical Report No. AL/HR-CR-1997-0003 for the Air Force Material Command, Armstrong Laboratory, Human Resources Directorate Brooks AFB, TX). Fairborn, OH: Klein Associates Inc. 122 pp.

Reason, James, 1990: Human Error. Cambridge University Press, 302 pp.  
[http://books.google.com/books?id=WJL8NZc8lZ8C&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](http://books.google.com/books?id=WJL8NZc8lZ8C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

Wood, David D., Leila J. Johannesen, Richard I. Cook, Nadine B. Sarter, 1994: Behind Human Error: Cognitive Systems, Computers and Hindsight (SOAR December 1994, from the Crew Systems Ergonomics Information Analysis Center). Wright-Patterson AFB, Columbus OH  
<http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA492127&Location=U2&doc=GetTRDoc.pdf>

## **Lesson 2: Cognitive Task Analysis of Expert Warning Forecasters**

### **References**

Hahn, B. B., E. Rall, D. W. Klinger, 2003: Cognitive Analysis of the Warning Forecaster Task. Klein Associates, Inc., Final Rep. RA1330-02-SE-0280, NOAA/NWS Office of Climate, Water, and Weather Services, 26 pp. [Available from Klein Associates, Inc., 1750 Commerce Center Blvd North, Fairborn, OH 45324-6362.]  
<http://www.wdtb.noaa.gov/modules/CTA/Final123102rev030108.pdf>

Hoffman, R. R., B. W. Crandall, N. R. Shadbolt, 1998: Use of the Critical Decision Method to Elicit Expert Knowledge: A Case Study in Cognitive Task Analysis Methodology. *Human Factors*, **40(2)**, 254-276.  
<http://hfs.sagepub.com/content/40/2/254>

Klein, G. A., 1993: A recognition-primed decision (RPD) model of rapid decision making. In G. A. Klein, J. Orasanu, R. Calderwood, & C. E. Zsombok (Eds.), *Decision making in action: Models and methods* (pp. 138-147). Norwood, NJ: Ablex.

Klein, G. A., R. Hoffman, 1993: Seeing the Invisible: Perceptual/Cognitive Aspects of Expertise. In M. Rabinowitz (Ed.), *Cognitive Science Foundations of Instruction* (pp. 203-226). Mahwah, NJ: Lawrence Erlbaum Associates.  
<http://www.questia.com/library/7924055/cognitive-science-foundations-of-instruction>

Pliske, R. M., D. Klinger, R. Hutton, B. Crandall, B. Knight, G. Klein, G., 1997: Understanding Skilled Weather Forecasting: Implications for Training and the Design of Forecasting Tools (Technical Report No. AL/HR-CR-1997-0003 for the Air Force Material Command, Armstrong Laboratory, Human Resources Directorate Brooks AFB, TX). Fairborn, OH: Klein Associates Inc.

## **Lesson 3: Learning from Post-Mortems**

### **References**

Aviation Safety Reporting System. NASA.  
<http://asrs.arc.nasa.gov/>

Galley, Mark, 2011: Cause Mapping. ThinkReliability.  
<http://www.thinkreliability.com>

Gano, Dean L., 1999: Apollo Root Cause Analysis: A New Way of Thinking. Yakima Wa: Apollonian Publications, 184 pp.

Hammond, Kenneth R., 1996: Human Judgment and Social Policy: Irreducible Uncertainty, Inevitable Error, Unavoidable Injustice. New York: Oxford University Press. 448 pp.  
[http://books.google.com/books?id=Z\\_DZ3nKHq2cC&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](http://books.google.com/books?id=Z_DZ3nKHq2cC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

Reason, James, 1990: Human Error. Cambridge University Press, 302 pp.  
[http://books.google.com/books?id=WJL8NZc8lZ8C&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](http://books.google.com/books?id=WJL8NZc8lZ8C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

Root Cause Live  
<http://www.rootcauselive.com>

Shappell, S., D. Wiegmann, 2000: The Human Factors Analysis and Classification System (HFACS). (Report Number DOT/FAA/AM-00/7). Washington DC: Federal Aviation Administration.  
[http://www.nifc.gov/fireInfo/fireInfo\\_documents/humanfactors\\_classAnly.pdf](http://www.nifc.gov/fireInfo/fireInfo_documents/humanfactors_classAnly.pdf)

Shappell, S., D. Wiegmann. A Human Factors Approach to Accident Analysis and Prevention, Workshop, 45<sup>th</sup> Conference on Human Factors and Ergonomics Society, Minneapolis, 2001

Wood, David D., Leila J. Johannesen, Richard I. Cook, Nadine B. Sarter, 1994: Behind Human Error: Cognitive Systems, Computers and Hindsight (SOAR December 1994, from the Crew Systems Ergonomics Information Analysis Center). Wright-Patterson AFB, Columbus OH  
<http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA492127&Location=U2&doc=GetTRDoc.pdf>

## **IC Core 4: Conveying Warnings and Public Response**

### **Lesson 1: Mitigating Potential Errors in Spotter Reports**

#### **References**

Baumgardt, D., D. Rosendahl, T. Shea, 2001: The Storm Spotter Hail Approximation Project: How good are your spotters?. NWS, LaCrosse

Baumgardt, D., 2002: Hail Estimation: How Good Are Your Spotters? NOAA/National Weather Service La Crosse, WI.  
[http://www.crh.noaa.gov/arx/hail\\_size\\_MSP.pdf](http://www.crh.noaa.gov/arx/hail_size_MSP.pdf)

Baumgardt, D. 2004: Personal communications.

Changnon, Stanley A., 1968: Effect of Sampling Density on Areal Extent of Damaging Hail. *J. Appl. Meteor.*, 7, 518–521.  
doi: [http://dx.doi.org/10.1175/1520-0450\(1968\)007<0518:EOSDOA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0450(1968)007<0518:EOSDOA>2.0.CO;2)

Edwards, Roger, Richard L. Thompson, 1998: Nationwide Comparisons of Hail Size with WSR-88D Vertically Integrated Liquid Water and Derived Thermodynamic Sounding Data. *Wea. Forecasting*, **13**, 277–285.

doi: [http://dx.doi.org/10.1175/1520-0434\(1998\)013<0277:NCOHSW>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1998)013<0277:NCOHSW>2.0.CO;2)

Herzog, R. F., S. J. Morrison, 1994: Hail frequency in the United States, Haag Engineering Co. Rep., 18 pp. [Available from Haag Engineering Company, P.O. Box 814245, Dallas, TX 75381.]

LaDue, J. G., 2003: The role of spotters in the integrated warning system. Sierra Storm Broadcasters Conference, Reno.

Moller, A., 2004: Personal communications.

National Weather Service, 1997: Special Report: Evaluation of the reported January 11-12, 1997, Montague, New York, 77-inch, 24-hour lake-effect snowfall. p. 46.

<http://www1.ncdc.noaa.gov/pub/data/cmb/special-reports/ncec/mantague-ny-snowfall-24hour.pdf>

Speheger, Douglas A., Charles A. Doswell, Gregory J. Stumpf, 2002: The Tornadoes of 3 May 1999: Event Verification in Central Oklahoma and Related Issues. *Wea. Forecasting*, **17**, 362–381.

doi: [http://dx.doi.org/10.1175/1520-0434\(2002\)017<0362:TTOMEV>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2002)017<0362:TTOMEV>2.0.CO;2)

Speheger, D. A., R. D. Smith, 2006: On the imprecision of radar signature locations and storm path forecasts. *Natl. Wea. Dig.*, **30**, 3-10.

<http://www.nwas.org/digest/papers/2006/Vol30No1/Pg3-Speheger.pdf>

Smith, R. D., 2013: Personal communications.

Weiss, S. J., M. D. Vescio, 1996: Severe local storm climatology 1955-1996: Analysis of reporting trends and implications for NWS operations. *Preprints, 19<sup>th</sup> Conf. on Severe Local Storms, Minneapolis*, Amer. Meteor. Soc., 536-539.

Witt, Arthur, Michael D. Eilts, Gregory J. Stumpf, J. T. Johnson, E. De Wayne Mitchell, Kevin W. Thomas, 1998: An Enhanced Hail Detection Algorithm for the WSR-88D. *Wea. Forecasting*, **13**, 286–303.

doi: [http://dx.doi.org/10.1175/1520-0434\(1998\)013<0286:AEHDAF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1998)013<0286:AEHDAF>2.0.CO;2)

Witt, Arthur, Michael D. Eilts, Gregory J. Stumpf, E. De Wayne Mitchell, J. T. Johnson, Kevin W. Thomas, 1998: Evaluating the Performance of WSR-88D Severe Storm Detection Algorithms. *Wea. Forecasting*, **13**, 513–518.

doi: [http://dx.doi.org/10.1175/1520-0434\(1998\)013<0513:ETPOWS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1998)013<0513:ETPOWS>2.0.CO;2)

## **Lesson 2: The Warning Response Process**

### **References**

National Weather Service, 2009: Service Assessment: Mother's Day Weekend Tornado in Oklahoma and Missouri, May 10, 2008. 38 pp.

[http://www.nws.noaa.gov/om/assessments/pdfs/mothers\\_day09.pdf](http://www.nws.noaa.gov/om/assessments/pdfs/mothers_day09.pdf)

National Weather Service, 2009: Service Assessment: Super Tuesday Tornado Outbreak of February 5-6, 2008. 48 pp.

[http://www.nws.noaa.gov/om/assessments/pdfs/super\\_tuesday.pdf](http://www.nws.noaa.gov/om/assessments/pdfs/super_tuesday.pdf)

Simmons, Kevin M., Daniel Sutter, 2009: False Alarms, Tornado Warnings, and Tornado Casualties. *Wea. Climate Soc.*, 1, 38–53.

doi: <http://dx.doi.org/10.1175/2009WCAS1005.1>

### **Lesson 3: Effective Warnings**

#### **References**

Smith, Richard: The Role of Effective Communications in the Warning Process. *Advanced Warning Decision Making III Workshop Presentation*, DOC/NOAA/NWS Warning Decision Training Branch.

<http://www.wdtb.noaa.gov/workshop/wdm/originals/WDMIII.pdf>

Mileti, Dennis S. John H. Sorensen, 1990: Communication of Emergency Public Warnings: A Social Science Perspective and State-of-the-Art Assessment. Report ORNL-6609 for the Federal Emergency Management Agency. Oak Ridge, TN: Oak Ridge National Laboratory.

<http://emc.ed.ornl.gov/publications/PDF/CommunicationFinal.pdf>

Piltz, Steven, Richard Smith, 2008: Correlation Between Tornado Damage Paths and WSR-88D Signatures, and Resulting Implications for the use of Pathcasts in Tornado Warnings. National Weather Association Meeting, Oklahoma City, 2008.

Gruntfest, Eve, 2002: Toward Improved Understanding of Warnings for Short-fuse Weather Events. Paper presented at U.S. Weather Research Program, Warm Season Precipitation Workshop, National Center for Atmospheric Research, Boulder, CO.

Mileti, D. S., 1995: Factors Related to Flood Warning Response. U.S. – Italy Research Workshop on the Hydrometeorology, Impacts, and Management of Extreme Floods.

<http://www.engr.colostate.edu/~jsalas/us-italy/papers/46mileti.pdf>

National Weather Service, 2005: Instruction 10-511: WFO Severe Weather Products Specification. November 2005.

<http://www.nws.noaa.gov/directives/sym/pd01005011curr.pdf>

National Weather Service, 2009: Instruction 10-922: WFO Hydrologic Products Specification. August 2009.

<http://www.nws.noaa.gov/directives/sym/pd01009022curr.pdf>

### **Lesson 4: Social Science Aspects of Post Mortems**

#### **References**

Alaszewski, A., 2005: Risk communication: Identifying the importance of social context. *Health, Risk & Society*, 7(2), 101-105

Brewer, J., A. Hunter, 1989: *Multimethod Research: A Synthesis of Styles*. Newbury Park: Sage.

Burningham, K., J. Fielding, D. Thrush, 2007: 'It'll Never Happen to Me': Understanding Public Awareness of Local Flood Risk. *Disasters*, 32(2), 216 – 238.  
doi: 10.1111/j.0361-3666.2007.10136.x

<http://onlinelibrary.wiley.com/doi/10.1111/j.1467-7717.2007.01036.x/pdf>

Burnside, R., D. S. Miller, J. D. Rivera, 2007: The Impact of Information and Risk Perception on the Hurricane Evacuation Decision-Making of Greater New Orleans Residents. *Sociological Spectrum*, 27, 727-740.

Calderon, J. L., R. S. Baker, K. E. Wolf, 2000: Focus groups: A Qualitative Method Complementing Quantitative Research for Studying Culturally Diverse Groups. *Education of Health*, 13(1), 91 -95.

[http://www.educationforhealth.net/EfHArticleArchive/1357-6283\\_v13n1s12\\_713664873.pdf](http://www.educationforhealth.net/EfHArticleArchive/1357-6283_v13n1s12_713664873.pdf)

Creswell, J. W., 2006: *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Thousand Oaks, CA: Sage.

<http://books.google.com/books?id=DetLkgQeTJgC&printsec=frontcover#v=onepage&q&f=false>

Desvousges, W. H., J. H. Frey, 1989: Integrating Focus Groups and Surveys: Examples from Environmental Risk Studies, *Journal of Official Statistics*, 5(4), 349-363.

<http://www.jos.nu/Articles/article.asp>

Krathwohl, D. R., 1997: *Methods of educational and social science research: An integrated Approach*. New York: Longman.

Leininger, M. M., 1985: Ethnography and Ethnonursing: Models and modes of qualitative data analysis. In M. M. Leininger (Ed.), *Qualitative research methods in nursing* (pp. 33-72). Orlando, FL: Grune & Stratton.

Lundgren, R., A., McMakin, 2004: *Risk Communication: A Handbook for Communicating Environmental Safety, and Health Risks*. Columbus, OH: Battelle Press.

Sattler, D. N., C. F. Kaiser, J. B. Hittner, 2000: Disaster Preparedness: Relationships Among Prior Experience, Personal Characteristics, and Distress. *Journal of Applied Personal Sociology*, 30(7), 1396 – 1420.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1559-1816.2000.tb02527.x/abstract>

Spence, P. R., K. A. Lachlan, D. Griffin, 2007: Crisis Communication, Race, and Natural Disasters. *Journal of Black Studies*, 37, 539.

doi: 10.1177/0021934706296192

<http://jbs.sagepub.com/content/37/4/539.full.pdf+html>

Strauss, A., J. Corbin, 1990: *Basics of Qualitative Research*. Newbury Park, CA: Sage.

Wolff, B., J. Knodel, W. Sittitjai, 1993: Focus groups and surveys as complementary research methods. In D. L. Morgan (Ed.). *Successful Focus Groups: Advancing the State of the Art*. (pp.118 - 136). Newbury Park, CA: Sage.

# **AWOC Core Track Crisis Communications Module 1: Crisis Communication Cycle & Stories of Decision Support**

## **Lesson: Crisis Communication Cycle & Stories of Decision Support**

### References

Centers for Disease Control and Prevention, 2002: Crisis and Emergency Risk Communication <http://www.bt.cdc.gov/cerc/pdf/CERC-SEPT02.pdf>

# **AWOC Core Track Crisis Communication Module 2: Tools for Improving Risk Management Support to Stakeholders**

### References

Bogdan, R., and S. K. Biklen, 2007: *Qualitative Research for Education: An Introduction to Theory and Methods*. Fifth ed. Pearson Education, Inc., 304 pp.

Davidson, J. W., 2005: *Evaluation Methodology Basics: The Nuts and Bolts of Sound Evaluation*. SAGE Publications, 263 pp.

FEMA Emergency Support Function Annexes: Introduction

Glesne, C., 2006: *Becoming Qualitative Researchers: An Introduction*. 3rd ed. Pearson Education, Inc., 246 pp.

Kitzinger, J., 1995: Qualitative Research: Introducing focus groups. *British Medical Journal*, **311**, 299-302.

Klein, G., 2003: *The Power of Intuition: How to Use Your Gut Feelings to Make Better Decisions at Work*. Currency Doubleday, 334 pp.

Losego, Jessica: Presentation for the Storm Prediction Center, December 6, 2011.

Mertens, D. M., 2005: *Research and Evaluation in Education and Psychology*. 2nd ed. Sage Publications, 507 pp.

Montz, B. E., J. L. Losego, and C. F. Smith, 2011: CRC Cards: A method to learn about emergency management decision processes. *Sixth Symposium on Policy and Socio-economic Research*, Seattle, WA, American Meteorological Society.

Patton, M. Q., 2002: *Qualitative Research & Evaluation Methods*. 3rd ed. Sage Publications, 688 pp.

Quoetone, L., 2011: Expertise and Effective Office Warning Strategies, Lesson 1: Expertise.

*Advanced Warning Operations Course*, NOAA NWS Warning Decision Training Branch, Ed.

Smith, R., 20Steps to Conducting a CRC Card Session Taken from "Using CRC Cards,"  
by Nancy M. Wilkinson, pages 47–78.

<http://disaster.renci.org>

USAID, 1996: Performance Monitoring and Evaluation TIPS: Conducting Focus Groups.  
USAID, 4 pp.

# Severe Track

## IC Severe 1 - Conceptual Models

### Lesson 1: Conceptual Models for Supercell Tornadoic Storms

#### References

Atkins, Nolan T., Morris L. Weisman, Louis J. Wicker, 1999: The Influence of Preexisting Boundaries on Supercell Evolution. *Mon. Wea. Rev.*, **127**, 2910–2927.

doi: [http://dx.doi.org/10.1175/1520-0493\(1999\)127<2910:TIOPBO>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1999)127<2910:TIOPBO>2.0.CO;2)

Atkins, Nolan T., Justin M. Arnott, Ron W. Przybylinski, Ray A. Wolf, Bradley D. Ketcham, 2004: Vortex Structure and Evolution within Bow Echoes. Part I: Single-Doppler and Damage Analysis of the 29 June 1998 Derecho. *Mon. Wea. Rev.*, **132**, 2224–2242.

doi: [http://dx.doi.org/10.1175/1520-0493\(2004\)132<2224:VSAEWB>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2004)132<2224:VSAEWB>2.0.CO;2)

Atkins, Nolan T., Christopher S. Bouchard, Ron W. Przybylinski, Robert J. Trapp, Gary Schmocker, 2005: Damaging Surface Wind Mechanisms within the 10 June 2003 Saint Louis Bow Echo during BAMEX. *Mon. Wea. Rev.*, **133**, 2275–2296.

doi: <http://dx.doi.org/10.1175/MWR2973.1>

Atkins, Nolan T., Michael St. Laurent, 2009: Bow Echo Mesovortices. Part I: Processes That Influence Their Damaging Potential. *Mon. Wea. Rev.*, **137**, 1497–1513.

doi: <http://dx.doi.org/10.1175/2008MWR2649.1>

Atkins, Nolan T., Michael St. Laurent, 2009: Bow Echo Mesovortices. Part II: Their Genesis. *Mon. Wea. Rev.*, **137**, 1514–1532.

doi: <http://dx.doi.org/10.1175/2008MWR2650.1>

Brown, R. A., D. W. Burgess, K. C. Crawford, 1973: Twin tornado cyclones within a severe thunderstorm: Single Doppler radar observations. *Weatherwise*, **26**, 63-71.

Browning K. A.. 1965a: A family outbreak of severe local storms - A comprehensive study of the storms in Oklahoma on 26 May 1963. Part I. Air Force Cambridge Research Lab, Special Report No. 32, 346 pp.

Bryan, George H., Jason C. Knievel, Matthew D. Parker, 2006: A Multimodel Assessment of RKW Theory's Relevance to Squall-Line Characteristics. *Mon. Wea. Rev.*, **134**, 2772–2792.

doi: <http://dx.doi.org/10.1175/MWR3226.1>

Burgess, D. W., 1974: Study of a right moving thunderstorm utilizing new single Doppler radar evidence. Masters Thesis, Dept. of Meteor., University of Oklahoma, Norman, OK, 77 pp.

Burgess, D. W., L. R. Lemon, 1976: Union City storm history. Chapter 5, The Union City, Oklahoma tornado of 24 May 1973. R. A. Brown, Editor. NOAA Tech. Memo. ERL NSSL-80, Norman, National Severe Thunderstorms Laboratory, 33-51.

Burgess, D. W., R. A. Brown, L. R. Lemon, C. R. Safford, 1977: Evolution of a tornadic thunderstorm. *Preprints, 10th Conf. on Severe Local Storms, Boston*, Amer. Meteor. Soc., 84-89.

Burgess, D. W., 2004: High resolution analyses of the 8 May 2003 Oklahoma City storm. Part I: Storm structure and evolution from radar data. *Preprints, 22nd Conf. Severe Local Storms, Hyannis, MA*, Amer. Meteor. Soc.,

Burke, Patrick C., David M. Schultz, 2004: A 4-Yr Climatology of Cold-Season Bow Echoes over the Continental United States. *Wea. Forecasting*, **19**, 1061–1074.  
doi: <http://dx.doi.org/10.1175/811.1>

COMET, 1996: A Convective Storm Matrix: Buoyancy/Shear Dependencies, Cooperative Program for Operational Meteorology, Education and Training, Distance Learning Program.  
<http://www.meted.ucar.edu/convectn/mcs/>.

Coniglio, Michael C., David J. Stensrud, Michael B. Richman, 2004: An Observational Study of Derecho-Producing Convective Systems. *Wea. Forecasting*, **19**, 320–337.  
doi: [http://dx.doi.org/10.1175/1520-0434\(2004\)019<0320:AOSODC>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2004)019<0320:AOSODC>2.0.CO;2)

Corfidi, Stephen F., 2003: Cold Pools and MCS Propagation: Forecasting the Motion of Downwind-Developing MCSs. *Wea. Forecasting*, **18**, 997–1017.  
doi: [http://dx.doi.org/10.1175/1520-0434\(2003\)018<0997:CPAMPF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2003)018<0997:CPAMPF>2.0.CO;2)

Craven, Jeffrey P., Ryan E. Jewell, Harold E. Brooks, 2002: Comparison between Observed Convective Cloud-Base Heights and Lifting Condensation Level for Two Different Lifted Parcels. *Wea. Forecasting*, **17**, 885–890.  
doi: [http://dx.doi.org/10.1175/1520-0434\(2002\)017<0885:CBOCCB>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2002)017<0885:CBOCCB>2.0.CO;2)

Dial, Greg L., Jonathan P. Racy, Richard L. Thompson, 2010: Short-Term Convective Mode Evolution along Synoptic Boundaries. *Wea. Forecasting*, **25**, 1430–1446.  
doi: <http://dx.doi.org/10.1175/2010WAF2222315.1>

Dowell, D. C., L. J. Wicker, 2004: High-resolution analyses of the 8 May 2003 Oklahoma City storm. Part II: EnKF data assimilation and forecast experiments. Paper **P10.3**, *Preprints, 22<sup>nd</sup> Conf. on Severe Local Storms*, Hyannis, MA, Amer. Meteor. Soc.

Evans, Jeffry S., Charles A. Doswell, 2001: Examination of Derecho Environments Using Proximity Soundings. *Wea. Forecasting*, **16**, 329–342.

doi: [http://dx.doi.org/10.1175/1520-0434\(2001\)016<0329:EODEUP>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2001)016<0329:EODEUP>2.0.CO;2)

French, A. J., M. D. Parker, 2006: Multiple modes of convection in moderate-to-high shear environments. *Preprints, 23rd Conf. Severe Local Storms, St. Louis, MO, Amer. Meteor. Soc.*, paper P12.6.

<https://ams.confex.com/ams/pdfpapers/115308.pdf>

Fujita T. T., 1992: *Memoirs of an Effort to Unlock the Mystery of Severe Storms*. Wind Research Lab, Research Paper 239, University of Chicago, 298 pp.

Funk, Theodore W., Kevin E. Darmofal, Joseph D. Kirkpatrick, Van L. DeWald, Ron W. Przybylinski, Gary K. Schmocker, Yeong-Jer Lin, 1999: Storm Reflectivity and Mesocyclone Evolution Associated with the 15 April 1994 Squall Line over Kentucky and Southern Indiana. *Wea. Forecasting*, **14**, 976–993.

doi: [http://dx.doi.org/10.1175/1520-0434\(1999\)014<0976:SRAMEA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1999)014<0976:SRAMEA>2.0.CO;2)

Gallus, William A., Nathan A. Snook, Elise V. Johnson, 2008: Spring and Summer Severe Weather Reports over the Midwest as a Function of Convective Mode: A Preliminary Study. *Wea. Forecasting*, **23**, 101–113.

doi: <http://dx.doi.org/10.1175/2007WAF2006120.1>

Gilmore, Matthew S., Louis J. Wicker, 2002: Influences of the Local Environment on Supercell Cloud-to-Ground Lightning, Radar Characteristics, and Severe Weather on 2 June 1995. *Mon. Wea. Rev.*, **130**, 2349–2372.

doi: [http://dx.doi.org/10.1175/1520-0493\(2002\)130<2349:IOTLEO>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2002)130<2349:IOTLEO>2.0.CO;2)

Klimowski, Brian A., Mark R. Hjelmfelt, Matthew J. Bunkers, 2004: Radar Observations of the Early Evolution of Bow Echoes. *Wea. Forecasting*, **19**, 727–734.

doi: [http://dx.doi.org/10.1175/1520-0434\(2004\)019<0727:ROOTEE>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2004)019<0727:ROOTEE>2.0.CO;2)

Kosiba, K., J. Wurman, Y. Richardson, P. Markowski, P. Robinson, and J. Marquis, 2012: Genesis of the Goshen County, Wyoming Tornado on 05 June 2009 during VORTEX2. *Mon. Wea. Rev.*

doi: <http://dx.doi.org/10.1175/MWR-D-12-00056.1>, in press

Lee, Bruce D., Catherine A. Finley, Christopher D. Karstens, 2012: The Bowdle, South Dakota, Cyclic Tornadic Supercell of 22 May 2010: Surface Analysis of Rear-Flank Downdraft Evolution and Multiple Internal Surges. *Mon. Wea. Rev.*, **140**, 3419–3441.

doi: <http://dx.doi.org/10.1175/MWR-D-11-00351.1>

Lemon, L. R., D. W. Burgess, R. A. Brown, 1975: Tornado production and storm sustenance. *Preprints, 9th Conf. on Severe Local Storms*, Boston Amer. Meteor. Soc., 100-104.

Lemon, L. R., D. W. Burgess, 1976: Tornadic storm airflow and morphology derived from single Doppler radar measurements. Chapter 8, *The Union City, Oklahoma*

tornado of 24 May 1973. R. A. Brown, Editor. *NOAA Tech. Memo. ERL NSSL-80*, Norman, National Severe Thunderstorms Laboratory, 85-106.

Lemon, L. R., 1977: Severe thunderstorm evolution: its use in a new technique for radar warnings. *Preprints, 10th Conf. on Severe Local Storms*, Boston, Amer. Meteor. Soc., 77-80.

Lemon, L. R., 1976: Tornadic storm evolution: vortex valve hypothesis. Appendix F, The Union City, Oklahoma tornado of 24 May 1973. R. A. Brown, Editor. *NOAA Tech. Memo. ERL NSSL-80*, Norman, National Severe Storms Laboratory, 229-234.

Lemon, L. R., 1977a: New severe thunderstorm radar identification techniques and warning criteria: a preliminary report. *NOAA Tech. Memo. NWS NSSFC-1*, Kansas City, National Severe Storms Forecast Center, 60 pp.

Lemon, Leslie R., Donald W. Burgess, Rodger A. Brown, 1978: Tornadic Storm Airflow and Morphology Derived from Single-Doppler Radar Measurements. *Mon. Wea. Rev.*, **106**, 48–61.

doi: [http://dx.doi.org/10.1175/1520-0493\(1978\)106<0048:TSAAMD>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1978)106<0048:TSAAMD>2.0.CO;2)

Lemon, L. R., 1978b: Improved application of conventional radar data and satellite imaging to severe thunderstorm detection and prediction. *Preprints, Conf. on Atmospheric Environment of Aerospace Systems and Applied Meteorology*, Boston, Amer. Meteor. Soc., 154-158.

Lemon, L. R., 1980: Severe thunderstorm radar identification techniques and warning criteria. *NOAA Tech. Memo. NWS NSSFC-3*, Kansas City, National Severe Storms Forecast Center, 60 pp.

Lese, 2006: Observations and quantification of low-level mesovortex evolution within the 4 July 2004 southwest Missouri high wind event, *23rd Conf. Severe Local Storms, St. Louis, MO*, Amer. Meteor. Soc., paper P6.1.

[https://ams.confex.com/ams/23SLS/techprogram/paper\\_115120.htm](https://ams.confex.com/ams/23SLS/techprogram/paper_115120.htm)

<https://ams.confex.com/ams/pdfpapers/115120.pdf>

Markowski, Paul M., Erik N. Rasmussen, Jerry M. Straka, David C. Dowell, 1998: Observations of Low-Level Baroclinity Generated by Anvil Shadows. *Mon. Wea. Rev.*, **126**, 2942–2958.

doi: [http://dx.doi.org/10.1175/1520-0493\(1998\)126<2942:OOLLBG>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1998)126<2942:OOLLBG>2.0.CO;2)

Markowski, Paul M., Jerry M. Straka, Erik N. Rasmussen, 2002: Direct Surface Thermodynamic Observations within the Rear-Flank Downdrafts of Nontornadic and Tornadic Supercells. *Mon. Wea. Rev.*, **130**, 1692–1721.

doi: [http://dx.doi.org/10.1175/1520-0493\(2002\)130<1692:DSTOWT>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2002)130<1692:DSTOWT>2.0.CO;2)

Markowski, Paul, Yvette Richardson, Erik Rasmussen, Jerry Straka, Robert Davies-Jones, Robert J. Trapp, 2008: Vortex Lines within Low-Level Mesocyclones Obtained from Pseudo-Dual-Doppler Radar Observations. *Mon. Wea. Rev.*, **136**, 3513–3535.  
doi: <http://dx.doi.org/10.1175/2008MWR2315.1>

Markowski, Paul, and Coauthors, 2012: The Pretornadic Phase of the Goshen County, Wyoming, Supercell of 5 June 2009 Intercepted by VORTEX2. Part I: Evolution of Kinematic and Surface Thermodynamic Fields. *Mon. Wea. Rev.*, **140**, 2887–2915.  
doi: <http://dx.doi.org/10.1175/MWR-D-11-00336.1>

Markowski, Paul, and Coauthors, 2012: The Pretornadic Phase of the Goshen County, Wyoming, Supercell of 5 June 2009 Intercepted by VORTEX2. Part II: Intensification of Low-Level Rotation. *Mon. Wea. Rev.*, **140**, 2916–2938.  
doi: <http://dx.doi.org/10.1175/MWR-D-11-00337.1>

Marquis, James, Yvette Richardson, Paul Markowski, David Dowell, Joshua Wurman, 2012: Tornado Maintenance Investigated with High-Resolution Dual-Doppler and EnKF Analysis. *Mon. Wea. Rev.*, **140**, 3–27.  
doi: <http://dx.doi.org/10.1175/MWR-D-11-00025.1>

Parker, Matthew D., Richard H. Johnson, 2004: Simulated Convective Lines with Leading Precipitation. Part I: Governing Dynamics. *J. Atmos. Sci.*, **61**, 1637–1655.  
doi: [http://dx.doi.org/10.1175/1520-0469\(2004\)061<1637:SCLWLP>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(2004)061<1637:SCLWLP>2.0.CO;2)

Parker, Matthew D., Richard H. Johnson, 2004: Simulated Convective Lines with Leading Precipitation. Part II: Evolution and Maintenance. *J. Atmos. Sci.*, **61**, 1656–1673.  
doi: [http://dx.doi.org/10.1175/1520-0469\(2004\)061<1656:SCLWLP>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(2004)061<1656:SCLWLP>2.0.CO;2)

Rasmussen, Erik N., Steven A. Rutledge, 1993: Evolution of Quasi-Two-Dimensional Squall Lines. Part I: Kinematic and Reflectivity Structure. *J. Atmos. Sci.*, **50**, 2584–2606.  
doi: [http://dx.doi.org/10.1175/1520-0469\(1993\)050<2584:EOQTDS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1993)050<2584:EOQTDS>2.0.CO;2)

Schmocker G. K., R. W. Przybylinski, E. N. Rasmussen, 2000: The severe bow echo event of 14 June 1998 over the mid-Mississippi valley region: A case of vortex development near the intersection of a preexisting boundary and a convective line. *Preprints, 20th Conf. on Severe Local Storms, Orlando, FL*, Amer. Meteor. Soc., 169–172.

Smull, Bradley F., Robert A. Houze, 1985: A Midlatitude Squall Line with a Trailing Region of Stratiform Rain: Radar and Satellite Observations. *Mon. Wea. Rev.*, **113**, 117–133.  
doi: [http://dx.doi.org/10.1175/1520-0493\(1985\)113<0117:AMSLWA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1985)113<0117:AMSLWA>2.0.CO;2)

Trapp, Robert J., Morris L. Weisman, 2003: Low-Level Mesovortices within Squall Lines and Bow Echoes. Part II: Their Genesis and Implications. *Mon. Wea. Rev.*, **131**, 2804–2823.

doi: [http://dx.doi.org/10.1175/1520-0493\(2003\)131<2804:LMWSLA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2003)131<2804:LMWSLA>2.0.CO;2)

Wakimoto, Roger M., Hanne V. Murphey, Christopher A. Davis, Nolan T. Atkins, 2006: High Winds Generated by Bow Echoes. Part II: The Relationship between the Mesovortices and Damaging Straight-Line Winds. *Mon. Wea. Rev.*, **134**, 2813–2829.

doi: <http://dx.doi.org/10.1175/MWR3216.1>

Weisman, Morris L., 1993: The Genesis of Severe, Long-Lived Bow Echoes. *J. Atmos. Sci.*, **50**, 645–670.

doi: [http://dx.doi.org/10.1175/1520-0469\(1993\)050<0645:TGOSLL>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1993)050<0645:TGOSLL>2.0.CO;2)

Weisman, Morris L., Robert J. Trapp, 2003: Low-Level Mesovortices within Squall Lines and Bow Echoes. Part I: Overview and Dependence on Environmental Shear. *Mon. Wea. Rev.*, **131**, 2779–2803.

doi: [http://dx.doi.org/10.1175/1520-0493\(2003\)131<2779:LMWSLA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2003)131<2779:LMWSLA>2.0.CO;2)

Wheatley, Dustan M., Robert J. Trapp, 2008: The Effect of Mesoscale Heterogeneity on the Genesis and Structure of Mesovortices within Quasi-Linear Convective Systems. *Mon. Wea. Rev.*, **136**, 4220–4241.

doi: <http://dx.doi.org/10.1175/2008MWR2294.1>

Wolf, R. A., 2006: A Preliminary Assessment of the Environmental and Radar Characteristics of Tornadic and Non-tornadic Mesovortices Associated with QLCs, *23rd Conf. Severe Local Storms, St. Louis, MO*, Amer. Meteor. Soc., paper P4.7.

[https://ams.confex.com/ams/23SLS/techprogram/paper\\_115155.htm](https://ams.confex.com/ams/23SLS/techprogram/paper_115155.htm)

<https://ams.confex.com/ams/pdfpapers/115155.pdf>

## **Lesson 2: Hail Storms**

### **References**

Blair, S. F., D. R. Deroche, J. M. Boustead, J. W. Leighton, B. L. Barjenbruch, W. P. Gargan, 2011: A radar-based assessment of the detectability of giant hail. *Electronic J. Severe Storms Meteor.*, **6** (7), 1–30.

<http://www.ejssm.org/ojs/index.php/ejssm/article/view/87/67>

Brimelow, Julian C., Gerhard W. Reuter, Eugene R. Poolman, 2002: Modeling Maximum Hail Size in Alberta Thunderstorms. *Wea. Forecasting*, **17**, 1048–1062.

doi: [http://dx.doi.org/10.1175/1520-0434\(2002\)017<1048:MMHSIA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2002)017<1048:MMHSIA>2.0.CO;2)

Conway, John W., Dušan S. Zrnić, 1993: A Study of Embryo Production and Hail Growth Using Dual-Doppler and Multiparameter Radars. *Mon. Wea. Rev.*, **121**, 2511–2528.

doi: [http://dx.doi.org/10.1175/1520-0493\(1993\)121<2511:ASOEPS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1993)121<2511:ASOEPS>2.0.CO;2)

Edwards, Roger, Richard L. Thompson, 1998: Nationwide Comparisons of Hail Size with WSR-88D Vertically Integrated Liquid Water and Derived Thermodynamic Sounding Data. *Wea. Forecasting*, **13**, 277–285.

doi: [http://dx.doi.org/10.1175/1520-0434\(1998\)013<0277:NCOHSW>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1998)013<0277:NCOHSW>2.0.CO;2)

Foote, G. Brant, 1984: A Study of Hail Growth Utilizing Observed Storm Conditions. *J. Climate Appl. Meteor.*, **23**, 84–101.

doi: [http://dx.doi.org/10.1175/1520-0450\(1984\)023<0084:ASOHGU>2.0.CO;2](http://dx.doi.org/10.1175/1520-0450(1984)023<0084:ASOHGU>2.0.CO;2)

Hubbert, J., V. N. Bringi, L. D. Carey, S. Bolen, 1998: CSU-CHILL Polarimetric Radar Measurements from a Severe Hail Storm in Eastern Colorado. *J. Appl. Meteor.*, **37**, 749–775.

doi: [http://dx.doi.org/10.1175/1520-0450\(1998\)037<0749:CCPRMF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0450(1998)037<0749:CCPRMF>2.0.CO;2)

Nelson, Stephan P., 1987: The Hybrid Multicellular–Supercellular Storm—an Efficient Hail Producer. Part II. General Characteristics and Implications for Hail Growth. *J. Atmos. Sci.*, **44**, 2060–2073.

doi: [http://dx.doi.org/10.1175/1520-0469\(1987\)044<2060:THMSEH>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1987)044<2060:THMSEH>2.0.CO;2)

Lemon, L. R., D. W. Burgess, 1993: Supercell associated deep convergence zone revealed by a WSR-88D. Preprints, 26th Conf. on Radar Meteorology, Norman, OK, Amer. Meteor. Soc., 206-208.

Lemon, L. R., S. Parker, 1996: The Lahoma storm deep convergence zone: Its characteristics and role in storm dynamics and severity. Preprints, 18th Conf. on Severe Local Storms, San Francisco, CA, Amer. Meteor. Soc., 70-75.

Lemon, Leslie R., 1998: The Radar “Three-Body Scatter Spike”: An Operational Large-Hail Signature. *Wea. Forecasting*, **13**, 327–340.

doi: [http://dx.doi.org/10.1175/1520-0434\(1998\)013<0327:TRTBSS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1998)013<0327:TRTBSS>2.0.CO;2)

Rasmussen, Roy M., Andrew J. Heymsfield, 1987: Melting and Shedding of Graupel and Hail. Part II: Sensitivity Study. *J. Atmos. Sci.*, **44**, 2764–2782.

doi: [http://dx.doi.org/10.1175/1520-0469\(1987\)044<2764:MASOGA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1987)044<2764:MASOGA>2.0.CO;2)

Witt, Arthur, Stephan P. Nelson, 1991: The Use of Single-Doppler Radar for Estimating Maximum Hailstone Size. *J. Appl. Meteor.*, **30**, 425–431.

doi: [http://dx.doi.org/10.1175/1520-0450\(1991\)030<0425:TUOSDR>2.0.CO;2](http://dx.doi.org/10.1175/1520-0450(1991)030<0425:TUOSDR>2.0.CO;2)

Witt, A., 1996: The relationship between low-elevation WSR-88D reflectivity and hail at the ground using precipitation observations from the VORTEX project. Preprints, 18<sup>th</sup> Conf. on Severe Local Storms, San Francisco, CA, Amer. Meteor. Soc., 183-185.

Witt, Arthur, Michael D. Eilts, Gregory J. Stumpf, J. T. Johnson, E. De Wayne Mitchell, Kevin W. Thomas, 1998: An Enhanced Hail Detection Algorithm for the WSR-88D. *Wea. Forecasting*, **13**, 286–303.

doi: [http://dx.doi.org/10.1175/1520-0434\(1998\)013<0286:AEHDAF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1998)013<0286:AEHDAF>2.0.CO;2)

Zrnic, D. S., G. Zhang, V. Melnikov, J. Andric, 2010: Three-Body Scattering and Hail Size. *J. Appl. Meteor. Climatol.*, **49**, 687–700.

doi: <http://dx.doi.org/10.1175/2009JAMC2300.1>

### **Lesson 3: Flash Flooding**

#### **References**

Chappell, C., 1986: Quasi-stationary convective events. *Mesoscale Meteorology and Forecasting*, P. S. Ray, Ed., Amer. Meteor. Soc., 289-310.

Doswell, Charles A., Harold E. Brooks, Robert A. Maddox, 1996: Flash Flood Forecasting: An Ingredients-Based Methodology. *Wea. Forecasting*, **11**, 560–581.

doi: [http://dx.doi.org/10.1175/1520-0434\(1996\)011<0560:FFFAIB>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1996)011<0560:FFFAIB>2.0.CO;2)

Funk, Theodore W., 1991: Forecasting Techniques Utilized by the Forecast Branch of the National Meteorological Center During a Major Convective Rainfall Event. *Wea. Forecasting*, **6**, 548–564.

doi: [http://dx.doi.org/10.1175/1520-0434\(1991\)006<0548:FTUBTF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1991)006<0548:FTUBTF>2.0.CO;2)

Galarneau, Thomas J., Lance F. Bosart, Russ S. Schumacher, 2010: Predecessor Rain Events ahead of Tropical Cyclones. *Mon. Wea. Rev.*, **138**, 3272–3297.

doi: <http://dx.doi.org/10.1175/2010MWR3243.1>

Jones, Sarah C., and Coauthors, 2003: The Extratropical Transition of Tropical Cyclones: Forecast Challenges, Current Understanding, and Future Directions. *Wea. Forecasting*, **18**, 1052–1092.

doi: [http://dx.doi.org/10.1175/1520-0434\(2003\)018<1052:TETOTC>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2003)018<1052:TETOTC>2.0.CO;2)

Junker, Norman W., Russell S. Schneider, Stephanie L. Fauver, 1999: A Study of Heavy Rainfall Events during the Great Midwest Flood of 1993. *Wea. Forecasting*, **14**, 701–712.

doi: [http://dx.doi.org/10.1175/1520-0434\(1999\)014<0701:ASOHRE>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1999)014<0701:ASOHRE>2.0.CO;2)

Lowry, Dale A., 1972: Climatological Relationships Among Precipitable Water, Thickness and Precipitation. *J. Appl. Meteor.*, **11**, 1326–1333.

doi: [http://dx.doi.org/10.1175/1520-0450\(1972\)011<1326:CRAPWT>2.0.CO;2](http://dx.doi.org/10.1175/1520-0450(1972)011<1326:CRAPWT>2.0.CO;2)

Maddox, R. A., C. F. Chappell, L. R. Hoxit, 1979: Synoptic and Meso- $\alpha$  Scale Aspects of Flash Flood Events<sup>1</sup>. *Bull. Amer. Meteor. Soc.*, **60**, 115–123.

doi: <http://dx.doi.org/10.1175/1520-0477-60.2.115>

Moore, B. J., 2010: Synoptic-scale environments and dynamical mechanisms associated with predecessor rain events ahead of tropical cyclones. *M.S. Thesis, Department of Atmospheric and Environmental Sciences, University at Albany, State University of New York*, 154 pp.

Ralph, F. Martin, Paul J. Neiman, Gary A. Wick, 2004: Satellite and CALJET Aircraft Observations of Atmospheric Rivers over the Eastern North Pacific Ocean during the Winter of 1997/98. *Mon. Wea. Rev.*, **132**, 1721–1745.  
doi: [http://dx.doi.org/10.1175/1520-0493\(2004\)132<1721:SACAOO>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2004)132<1721:SACAOO>2.0.CO;2)

Ralph, F. Martin, Paul J. Neiman, Richard Rotunno, 2005: Dropsonde Observations in Low-Level Jets over the Northeastern Pacific Ocean from CALJET-1998 and PACJET-2001: Mean Vertical-Profile and Atmospheric-River Characteristics. *Mon. Wea. Rev.*, **133**, 889–910.  
doi: <http://dx.doi.org/10.1175/MWR2896.1>

Ralph, F. M., P. J. Neiman, G. A. Wick, S. I. Gutman, M. D. Dettinger, D. R. Cayan, A. B. White, 2006: Flooding on California's Russian River: Role of Atmospheric Rivers, *Geophys. Res. Lett.*, **33**, L13801  
doi:[10.1029/2006GL026689](http://dx.doi.org/10.1029/2006GL026689).

Zhu, Yong, Reginald E. Newell, 1998: A Proposed Algorithm for Moisture Fluxes from Atmospheric Rivers. *Mon. Wea. Rev.*, **126**, 725–735.  
doi: [http://dx.doi.org/10.1175/1520-0493\(1998\)126<0725:APAFMF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1998)126<0725:APAFMF>2.0.CO;2)

## IC Severe 2 - Threat Assessment

### Lesson 1: Lifting Mechanisms

#### References

Bluestein, Howard B., Morris L. Weisman, 2000: The Interaction of Numerically Simulated Supercells Initiated along Lines. *Mon. Wea. Rev.*, **128**, 3128–3149.  
doi: [http://dx.doi.org/10.1175/1520-0493\(2000\)128<3128:TIONSS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2000)128<3128:TIONSS>2.0.CO;2)

Dailey, Peter S., Robert G. Fovell, 1999: Numerical Simulation of the Interaction between the Sea-Breeze Front and Horizontal Convective Rolls. Part I: Offshore Ambient Flow. *Mon. Wea. Rev.*, **127**, 858–878.  
doi: [http://dx.doi.org/10.1175/1520-0493\(1999\)127<0858:NSOTIB>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1999)127<0858:NSOTIB>2.0.CO;2)

Dial, Greg L., Jonathan P. Racy, Richard L. Thompson, 2010: Short-Term Convective Mode Evolution along Synoptic Boundaries. *Wea. Forecasting*, **25**, 1430–1446.  
doi: <http://dx.doi.org/10.1175/2010WAF2222315.1>

Ralph, F. M., V. Venkateswaran, M. Crochet, 1993: Observations of a Mesoscale Ducted Gravity Wave. *J. Atmos. Sci.*, **50**, 3277–3291.  
doi: [http://dx.doi.org/10.1175/1520-0469\(1993\)050<3277:OOAMDG>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1993)050<3277:OOAMDG>2.0.CO;2)

Schultz, David M., Frederick Sanders, 2002: Upper-Level Frontogenesis Associated with the Birth of Mobile Troughs in Northwesterly Flow. *Mon. Wea. Rev.*, **130**, 2593–2610.  
doi: [http://dx.doi.org/10.1175/1520-0493\(2002\)130<2593:ULFAWT>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2002)130<2593:ULFAWT>2.0.CO;2)

Steenburgh, W. James, Clifford F. Mass, 1994: The Structure and Evolution of a Simulated Rocky Mountain Lee Trough. *Mon. Wea. Rev.*, **122**, 2740–2761.  
doi: [http://dx.doi.org/10.1175/1520-0493\(1994\)122<2740:TSAEOA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1994)122<2740:TSAEOA>2.0.CO;2)

Weisman, Morris L., Joseph B. Klemp, Richard Rotunno, 1988: Structure and Evolution of Numerically Simulated Squall Lines. *J. Atmos. Sci.*, **45**, 1990–2013.  
doi: [http://dx.doi.org/10.1175/1520-0469\(1988\)045<1990:SAEONS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1988)045<1990:SAEONS>2.0.CO;2)

Wilson, James W., Daniel L. Megenhardt, 1997: Thunderstorm Initiation, Organization, and Lifetime Associated with Florida Boundary Layer Convergence Lines. *Mon. Wea. Rev.*, **125**, 1507–1525.  
doi: [http://dx.doi.org/10.1175/1520-0493\(1997\)125<1507:TIOALA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1997)125<1507:TIOALA>2.0.CO;2)

Ziegler, Conrad L., Erik N. Rasmussen, 1998: The Initiation of Moist Convection at the Dryline: Forecasting Issues from a Case Study Perspective. *Wea. Forecasting*, **13**, 1106–1131.  
doi: [http://dx.doi.org/10.1175/1520-0434\(1998\)013<1106:TIOACA>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1998)013<1106:TIOACA>2.0.CO;2)

## **Lesson 2: Short-Term Assessment**

### **References**

Bluestein, Howard B., Morris L. Weisman, 2000: The Interaction of Numerically Simulated Supercells Initiated along Lines. *Mon. Wea. Rev.*, **128**, 3128–3149.  
doi: [http://dx.doi.org/10.1175/1520-0493\(2000\)128<3128:TIONSS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2000)128<3128:TIONSS>2.0.CO;2)

Davies, Jonathan M., 2006: Tornadoes in Environments with Small Helicity and/or High LCL Heights. *Wea. Forecasting*, **21**, 579–594.  
doi: <http://dx.doi.org/10.1175/WAF928.1>

Hamill, Thomas M., Russell S. Schneider, Harold E. Brooks, Gregory S. Forbes, Howard B. Bluestein, Michael Steinberg, Daniel Meléndez, Randall M. Dole, 2005: The May 2003 Extended Tornado Outbreak. *Bull. Amer. Meteor. Soc.*, **86**, 531–542.  
doi: <http://dx.doi.org/10.1175/BAMS-86-4-531>

Johns, Robert H., 1993: Meteorological Conditions Associated with Bow Echo Development in Convective Storms. *Wea. Forecasting*, **8**, 294–299.  
doi: [http://dx.doi.org/10.1175/1520-0434\(1993\)008<0294:MCAWBE>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1993)008<0294:MCAWBE>2.0.CO;2)

Thompson, Richard L., Bryan T. Smith, Jeremy S. Grams, Andrew R. Dean, Chris Broyles, 2012: Convective Modes for Significant Severe Thunderstorms in the Contiguous United States. Part II: Supercell and QLCS Tornado Environments. *Wea. Forecasting*, **27**, 1136–1154.  
doi: <http://dx.doi.org/10.1175/WAF-D-11-00116.1>

## **Lesson 3: Threat Assessment of Quasi-Linear Convective Systems (QLCSs)**

### **References**

Lombardo, Kelly A., Brian A. Colle, 2012: Ambient Conditions Associated with the Maintenance and Decay of Quasi-Linear Convective Systems Crossing the Northeastern U.S. Coast. *Mon. Wea. Rev.*, **140**, 3805–3819.

doi: <http://dx.doi.org/10.1175/MWR-D-12-00050.1>

Letkewicz, Casey E., Matthew D. Parker, 2010: Forecasting the Maintenance of Mesoscale Convective Systems Crossing the Appalachian Mountains. *Wea. Forecasting*, **25**, 1179–1195.

doi: <http://dx.doi.org/10.1175/2010WAF2222379.1>

Corfidi, Stephen F., 2003: Cold Pools and MCS Propagation: Forecasting the Motion of Downwind-Developing MCSs. *Wea. Forecasting*, **18**, 997–1017.

doi: [http://dx.doi.org/10.1175/1520-0434\(2003\)018<0997:CPAMPF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2003)018<0997:CPAMPF>2.0.CO;2)

Schaumann, Jason S., R. W. Przybylinski 2012: Operational Application of 0-3 km Bulk Shear Vectors in Assessing Quasi Linear Convective System Mesovortex and Tornado Potential. 26<sup>th</sup> Conference on Severe Local Storms, Nashville, TN, American Meteorology Society, P 9.10.

<https://ams.confex.com/ams/26SLS/webprogram/Paper212008.html>

[https://ams.confex.com/ams/26SLS/webprogram/Manuscript/Paper212008/SchaumannSLS2012\\_P142.pdf](https://ams.confex.com/ams/26SLS/webprogram/Manuscript/Paper212008/SchaumannSLS2012_P142.pdf)

[https://ams.confex.com/ams/26SLS/webprogram/Handout/Paper212008/SLS2012\\_Poster\\_03Vectors.pdf](https://ams.confex.com/ams/26SLS/webprogram/Handout/Paper212008/SLS2012_Poster_03Vectors.pdf)

National Weather Service, 2012: Service Assessment: The Historic Derecho of June 29, 2012. 61 pp.

<http://www.nws.noaa.gov/om/assessments/pdfs/derecho12.pdf>

Storm Prediction Center, 2012: Facts About Derechos – Very Damaging Windstorms. Retrieved December, 2012 from:

<http://www.spc.noaa.gov/misc/AbtDerechos/derechofacts.htm>

## **IC Severe 3 - Storm Interrogation**

### **Section 1: Locating Updrafts**

#### **Locating Updrafts of a Sheared Cell by Satellite**

##### **References**

Adler, Robert F., Robert A. Mack, 1986: Thunderstorm Cloud Top Dynamics as Inferred from Satellite Observations and a Cloud Top Parcel Model. *J. Atmos. Sci.*, **43**, 1945–1960.

doi: [http://dx.doi.org/10.1175/1520-0469\(1986\)043<1945:TCTDAI>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1986)043<1945:TCTDAI>2.0.CO;2)

RAMMB: Visit Training Sessions – Three Classes of Storm Top Signatures in Infrared Satellite Data

[http://rammb.cira.colostate.edu/training/visit/training\\_sessions/three\\_classes\\_of\\_storm\\_top\\_signatures\\_in\\_infrared\\_satellite\\_data/](http://rammb.cira.colostate.edu/training/visit/training_sessions/three_classes_of_storm_top_signatures_in_infrared_satellite_data/)

Roach, W.T., 1967: On the nature of the summit areas of severe storms in Oklahoma. *Quart. J. Roy. Meteor. Soc.*, 93, 318-336.  
<http://onlinelibrary.wiley.com/doi/10.1002/qj.49709339704/pdf>

## **Section 2: Updraft Strength**

### **Estimating Updraft Intensity with Satellite: Part 1&2**

#### References

Adler, Robert F., Douglas D. Fenn, 1979: Thunderstorm Intensity as Determined from Satellite Data. *J. Appl. Meteor.*, 18, 502–517.  
doi: [http://dx.doi.org/10.1175/1520-0450\(1979\)018<0502:TIADFS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0450(1979)018<0502:TIADFS>2.0.CO;2)

Adler, Robert F., Douglas D. Fenn, 1979: Thunderstorm Vertical Velocities Estimated from Satellite Data. *J. Atmos. Sci.*, 36, 1747–1754.  
doi: [http://dx.doi.org/10.1175/1520-0469\(1979\)036<1747:TVVEFS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1979)036<1747:TVVEFS>2.0.CO;2)

Adler, Robert F., Michael J. Markus, Douglas D. Fenn, 1985: Detection of Severe Midwest Thunderstorms Using Geosynchronous Satellite Data. *Mon. Wea. Rev.*, 113, 769–781.  
doi: [http://dx.doi.org/10.1175/1520-0493\(1985\)113<0769:DOSMTU>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1985)113<0769:DOSMTU>2.0.CO;2)

Adler, Robert F., Robert A. Mack, 1986: Thunderstorm Cloud Top Dynamics as Inferred from Satellite Observations and a Cloud Top Parcel Model. *J. Atmos. Sci.*, 43, 1945–1960.  
doi: [http://dx.doi.org/10.1175/1520-0469\(1986\)043<1945:TCTDAI>2.0.CO;2](http://dx.doi.org/10.1175/1520-0469(1986)043<1945:TCTDAI>2.0.CO;2)

Mack, Robert A., A. F. Hasler, Robert F. Adler, 1983: Thunderstorm Cloud Top Observations Using Satellite Stereoscopia. *Mon. Wea. Rev.*, 111, 1949–1964.  
doi: [http://dx.doi.org/10.1175/1520-0493\(1983\)111<1949:TCTOUS>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1983)111<1949:TCTOUS>2.0.CO;2)

## **Section 3: Tornadogenesis**

### **Part 1: Near Range Tornadogenesis Signatures Viewed by the WSR-88D**

#### References

Magsig, Michael A., D.W. Burgess, 1996: A Vorticity and Divergence Analysis Relating to Tornadogenesis As Seen by a WSR-88D Radar. *Preprints: 18th conference on Severe Local Storms, San Francisco, CA. Amer. Met. Soc.*, 418-422.

### **Part 2: Near Range Tornadogenesis Signatures Viewed by the TDWR**

#### References

Charles, M. E., D. L. Andra, M. P. Foster, D. J. Miller, 2003: Multiple Radar Comparison and Analysis of the 8 May 2003 Oklahoma City Tornadic Supercell. *Research Experience for Undergraduates Final Project*. 1 August 2003.  
<http://www.caps.ou.edu/reu/reu03/papers/Mike.pdf>

## **Supercell Collapse Phase**

### References

Brown, R. A., D. W. Burgess, K. C. Crawford, 1973: Twin Tornado Cyclones Within a Severe Thunderstorm: Single Doppler Radar Observations. *Weatherwise*, 26, 63-71.

Browning, K. A., 1965: A Family Outbreak of Severe Local Storms – A Comprehensive Study of the Storms in Oklahoma on 26 May 1963, Part 1. Air Force Cambridge Research Lab, Special Report No. 32, 346 pp.

Burgess, D. W., 1974: Study of a right moving thunderstorm utilizing new single Doppler radar evidence. Masters Thesis, Dept. of Meteor., University of Oklahoma, Norman, OK, 77 pp.

Burgess, D. W., L. R. Lemon, 1976: Union City storm history. Chapter 5, The Union City, Oklahoma tornado of 24 May 1973. R. A. Brown, Editor. NOAA Tech. Memo. ERL NSSL-80, Norman, National Severe Thunderstorms Laboratory, 33-51.

Burgess, D. W., R. A. Brown, L. R. Lemon, C. R. Safford, 1977: Evolution of a tornadic thunderstorm. *Preprints, 10th Conf. on Severe Local Storms, Boston*, Amer. Meteor. Soc., 84-89.

Burgess, D. W., 2004: High resolution analyses of the 8 May 2003 Oklahoma City storm. Part I: Storm structure and evolution from radar data. *Preprints, 22nd Conf. Severe Local Storms, Hyannis, MA*, Amer. Meteor. Soc.,

Dowell, D. C., L. J. Wicker, D. J. Stensrud, 2004: High Resolution Analysis of the 8 May 2003 Oklahoma City Storm. Part II: EnKF Data Assimilation and Forecast Experiments. *Preprints, 22<sup>nd</sup> Conf. on Severe Local Storms, Hyannis, MA*, Amer. Meteor. Soc.

Lemon, L. R., D. W. Burgess, R. A. Brown, 1975: Tornado production and storm sustenance. *Preprints, 9th Conf. on Severe Local Storms, Boston* Amer. Meteor. Soc., 100-104.

Lemon, L. R., D. W. Burgess, 1976: Tornadic storm airflow and morphology derived from single Doppler radar measurements. Chapter 8, The Union City, Oklahoma tornado of 24 May 1973. R. A. Brown, Editor. *NOAA Tech. Memo. ERL NSSL-80*, Norman, National Severe Thunderstorms Laboratory, 85-106.

Lemon, L. R., 1977: Severe thunderstorm evolution: its use in a new technique for radar warnings. *Preprints, 10th Conf. on Severe Local Storms, Boston*, Amer. Meteor. Soc., 77-80.

Lemon, L. R., 1976: Tornadic storm evolution: vortex valve hypothesis. Appendix F, The Union City, Oklahoma tornado of 24 May 1973. R. A. Brown, Editor. *NOAA Tech. Memo. ERL NSSL-80*, Norman, National Severe Storms Laboratory, 229-234.

Lemon, L. R., 1977: New severe thunderstorm radar identification techniques and warning criteria: a preliminary report. *NOAA Tech. Memo. NWS NSSFC-1*, Kansas City, National Severe Storms Forecast Center, 60 pp.

Lemon, Leslie R., Donald W. Burgess, Rodger A. Brown, 1978: Tornadic Storm Airflow and Morphology Derived from Single-Doppler Radar Measurements. *Mon. Wea. Rev.*, **106**, 48–61.

doi: [http://dx.doi.org/10.1175/1520-0493\(1978\)106<0048:TSAAMD>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1978)106<0048:TSAAMD>2.0.CO;2)

Lemon, L. R., 1978: Improved application of conventional radar data and satellite imaging to severe thunderstorm detection and prediction. *Preprints, Conf. on Atmospheric Environment of Aerospace Systems and Applied Meteorology*, Boston, Amer. Meteor. Soc., 154-158.

Lemon, L. R., 1980: Severe thunderstorm radar identification techniques and warning criteria. *NOAA Tech. Memo. NWS NSSFC-3*, Kansas City, National Severe Storms Forecast Center, 60 pp.

## **Section 4: Non-Tornadic Wind Event Detection**

### **Extreme Non-Tornadic Wind Damage Events**

#### References

None

## **Section 5: Quasi-Linear Convective Systems**

### **QLCS Storm-Scale Interrogation and Warning Considerations**

#### References

Lombardo, Kelly A., Brian A. Colle, 2012: Ambient Conditions Associated with the Maintenance and Decay of Quasi-Linear Convective Systems Crossing the Northeastern U.S. Coast. *Mon. Wea. Rev.*, **140**, 3805–3819.

doi: <http://dx.doi.org/10.1175/MWR-D-12-00050.1>

Letkewicz, Casey E., Matthew D. Parker, 2010: Forecasting the Maintenance of Mesoscale Convective Systems Crossing the Appalachian Mountains. *Wea. Forecasting*, **25**, 1179–1195.

doi: <http://dx.doi.org/10.1175/2010WAF2222379.1>

Corfidi, Stephen F., 2003: Cold Pools and MCS Propagation: Forecasting the Motion of Downwind-Developing MCSs. *Wea. Forecasting*, **18**, 997–1017.

doi: [http://dx.doi.org/10.1175/1520-0434\(2003\)018<0997:CPAMPF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2003)018<0997:CPAMPF>2.0.CO;2)

Schaumann, Jason S., R. W. Przybylinski 2012: Operational Application of 0-3 km Bulk Shear Vectors in Assessing Quasi Linear Convective System Mesovortex and Tornado Potential. 26<sup>th</sup> Conference on Severe Local Storms, Nashville, TN, American Meteorology Society, P 9.10.  
<https://ams.confex.com/ams/26SLS/webprogram/Paper212008.html>  
[https://ams.confex.com/ams/26SLS/webprogram/Manuscript/Paper212008/SchaumannSLS2012\\_P142.pdf](https://ams.confex.com/ams/26SLS/webprogram/Manuscript/Paper212008/SchaumannSLS2012_P142.pdf)  
[https://ams.confex.com/ams/26SLS/webprogram/Handout/Paper212008/SLS2012\\_Poster\\_03Vectors.pdf](https://ams.confex.com/ams/26SLS/webprogram/Handout/Paper212008/SLS2012_Poster_03Vectors.pdf)

National Weather Service, 2012: Service Assessment: The Historic Derecho of June 29, 2012. 61 pp.  
<http://www.nws.noaa.gov/om/assessments/pdfs/derecho12.pdf>

Storm Prediction Center, 2012: Facts About Derechos – Very Damaging Windstorms. Retrieved December, 2012 from:  
<http://www.spc.noaa.gov/misc/AbtDerechos/derechofacts.htm>

## **Warning Decision Making Issues with Derecho-Producing QLCS Events**

### **References**

Lombardo, Kelly A., Brian A. Colle, 2012: Ambient Conditions Associated with the Maintenance and Decay of Quasi-Linear Convective Systems Crossing the Northeastern U.S. Coast. *Mon. Wea. Rev.*, **140**, 3805–3819.  
doi: <http://dx.doi.org/10.1175/MWR-D-12-00050.1>

Letkewicz, Casey E., Matthew D. Parker, 2010: Forecasting the Maintenance of Mesoscale Convective Systems Crossing the Appalachian Mountains. *Wea. Forecasting*, **25**, 1179–1195.  
doi: <http://dx.doi.org/10.1175/2010WAF2222379.1>

Corfidi, Stephen F., 2003: Cold Pools and MCS Propagation: Forecasting the Motion of Downwind-Developing MCSs. *Wea. Forecasting*, **18**, 997–1017.  
doi: [http://dx.doi.org/10.1175/1520-0434\(2003\)018<0997:CPAMPF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2003)018<0997:CPAMPF>2.0.CO;2)

Schaumann, Jason S., R. W. Przybylinski 2012: Operational Application of 0-3 km Bulk Shear Vectors in Assessing Quasi Linear Convective System Mesovortex and Tornado Potential. 26<sup>th</sup> Conference on Severe Local Storms, Nashville, TN, American Meteorology Society, P 9.10.  
<https://ams.confex.com/ams/26SLS/webprogram/Paper212008.html>  
[https://ams.confex.com/ams/26SLS/webprogram/Manuscript/Paper212008/SchaumannSLS2012\\_P142.pdf](https://ams.confex.com/ams/26SLS/webprogram/Manuscript/Paper212008/SchaumannSLS2012_P142.pdf)  
[https://ams.confex.com/ams/26SLS/webprogram/Handout/Paper212008/SLS2012\\_Poster\\_03Vectors.pdf](https://ams.confex.com/ams/26SLS/webprogram/Handout/Paper212008/SLS2012_Poster_03Vectors.pdf)

National Weather Service, 2012: Service Assessment: The Historic Derecho of June 29, 2012. 61 pp.  
<http://www.nws.noaa.gov/om/assessments/pdfs/derecho12.pdf>

Storm Prediction Center, 2012: Facts About Derechos – Very Damaging Windstorms. Retrieved December, 2012 from:  
<http://www.spc.noaa.gov/misc/AbtDerechos/derechofacts.htm>

# Flash Flood Track

## Lesson: Flash Flood Conceptual Models (AWOC Severe IC 1, Lesson 3)

### References

Chappell, C., 1986: Quasi-stationary convective events. *Mesoscale Meteorology and Forecasting*, P. S. Ray, Ed., Amer. Meteor. Soc., 289-310.

Doswell, Charles A., Harold E. Brooks, Robert A. Maddox, 1996: Flash Flood Forecasting: An Ingredients-Based Methodology. *Wea. Forecasting*, **11**, 560–581.  
doi: [http://dx.doi.org/10.1175/1520-0434\(1996\)011<0560:FFFAIB>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1996)011<0560:FFFAIB>2.0.CO;2)

Funk, Theodore W., 1991: Forecasting Techniques Utilized by the Forecast Branch of the National Meteorological Center During a Major Convective Rainfall Event. *Wea. Forecasting*, **6**, 548–564.  
doi: [http://dx.doi.org/10.1175/1520-0434\(1991\)006<0548:FTUBTF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1991)006<0548:FTUBTF>2.0.CO;2)

Galarneau, Thomas J., Lance F. Bosart, Russ S. Schumacher, 2010: Predecessor Rain Events ahead of Tropical Cyclones. *Mon. Wea. Rev.*, **138**, 3272–3297.  
doi: <http://dx.doi.org/10.1175/2010MWR3243.1>

Jones, Sarah C., and Coauthors, 2003: The Extratropical Transition of Tropical Cyclones: Forecast Challenges, Current Understanding, and Future Directions. *Wea. Forecasting*, **18**, 1052–1092.  
doi: [http://dx.doi.org/10.1175/1520-0434\(2003\)018<1052:TETOTC>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(2003)018<1052:TETOTC>2.0.CO;2)

Junker, Norman W., Russell S. Schneider, Stephanie L. Fauver, 1999: A Study of Heavy Rainfall Events during the Great Midwest Flood of 1993. *Wea. Forecasting*, **14**, 701–712.  
doi: [http://dx.doi.org/10.1175/1520-0434\(1999\)014<0701:ASOHRE>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1999)014<0701:ASOHRE>2.0.CO;2)

Lowry, Dale A., 1972: Climatological Relationships Among Precipitable Water, Thickness and Precipitation. *J. Appl. Meteor.*, **11**, 1326–1333.  
doi: [http://dx.doi.org/10.1175/1520-0450\(1972\)011<1326:CRAPWT>2.0.CO;2](http://dx.doi.org/10.1175/1520-0450(1972)011<1326:CRAPWT>2.0.CO;2)

Maddox, R. A., C. F. Chappell, L. R. Hoxit, 1979: Synoptic and Meso- $\alpha$  Scale Aspects of Flash Flood Events<sup>1</sup>. *Bull. Amer. Meteor. Soc.*, **60**, 115–123.  
doi: <http://dx.doi.org/10.1175/1520-0477-60.2.115>

Moore, B. J., 2010: Synoptic-scale environments and dynamical mechanisms associated with predecessor rain events ahead of tropical cyclones. *M.S. Thesis, Department of Atmospheric and Environmental Sciences, University at Albany, State University of New York*, 154 pp.

Ralph, F. Martin, Paul J. Neiman, Gary A. Wick, 2004: Satellite and CALJET Aircraft Observations of Atmospheric Rivers over the Eastern North Pacific Ocean during the Winter of 1997/98. *Mon. Wea. Rev.*, **132**, 1721–1745.

doi: [http://dx.doi.org/10.1175/1520-0493\(2004\)132<1721:SACAOO>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2004)132<1721:SACAOO>2.0.CO;2)

Ralph, F. Martin, Paul J. Neiman, Richard Rotunno, 2005: Dropsonde Observations in Low-Level Jets over the Northeastern Pacific Ocean from CALJET-1998 and PACJET-2001: Mean Vertical-Profile and Atmospheric-River Characteristics. *Mon. Wea. Rev.*, **133**, 889–910.

doi: <http://dx.doi.org/10.1175/MWR2896.1>

Ralph, F. M., P. J. Neiman, G. A. Wick, S. I. Gutman, M. D. Dettinger, D. R. Cayan, A. B. White, 2006: Flooding on California's Russian River: Role of Atmospheric Rivers, *Geophys. Res. Lett.*, **33**, L13801

doi:[10.1029/2006GL026689](http://dx.doi.org/10.1029/2006GL026689).

Zhu, Yong, Reginald E. Newell, 1998: A Proposed Algorithm for Moisture Fluxes from Atmospheric Rivers. *Mon. Wea. Rev.*, **126**, 725–735.

doi: [http://dx.doi.org/10.1175/1520-0493\(1998\)126<0725:APAFMF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(1998)126<0725:APAFMF>2.0.CO;2)

### **Lesson: On the Value of Anomalies (High Impact Hydro Events, Part 1)**

### **Lesson: Using Ensembles and Anomalies to Anticipate Extreme Flood Events (High Impact Hydro Events, Part 2)**

#### References

Bodner, M. J., N. W. Junker, R. H. Grumm, and R. S. Schumacher, 2011. Comparison of atmospheric circulation patterns during the 2008 and 1993 historic Midwest floods. *National Weather Digest*, **35**, 103-119.

Graham, Randall A., Richard H. Grumm, 2010: Utilizing Normalized Anomalies to Assess Synoptic-Scale Weather Events in the Western United States. *Wea. Forecasting*, **25**, 428–445.

doi: <http://dx.doi.org/10.1175/2009WAF2222273.1>

Hart, Robert E., Richard H. Grumm, 2001: Using Normalized Climatological Anomalies to Rank Synoptic-Scale Events Objectively. *Mon. Wea. Rev.*, **129**, 2426–2442.

doi: [http://dx.doi.org/10.1175/1520-0493\(2001\)129<2426:UNCATR>2.0.CO;2](http://dx.doi.org/10.1175/1520-0493(2001)129<2426:UNCATR>2.0.CO;2)

Junker, Norman W., Richard H. Grumm, Robert Hart, Lance F. Bosart, Katherine M. Bell, Frank J. Pereira, 2008: Use of Normalized Anomaly Fields to Anticipate Extreme Rainfall in the Mountains of Northern California. *Wea. Forecasting*, **23**, 336–356.

doi: <http://dx.doi.org/10.1175/2007WAF2007013.1>

Junker, Norman W., Michael J. Brennan, Frank Pereira, Michael J. Bodner, Richard H. Grumm, 2009: Assessing the Potential for Rare Precipitation Events with Standardized Anomalies and Ensemble Guidance at the Hydrometeorological Prediction Center. *Bull. Amer. Meteor. Soc.*, **90**, 445–453.

doi: <http://dx.doi.org/10.1175/2008BAMS2636.1>

Maddox, R. A., C. F. Chappell, L. R. Hoxit, 1979: Synoptic and Meso- $\alpha$  Scale Aspects of Flash Flood Events1. *Bull. Amer. Meteor. Soc.*, **60**, 115–123.  
doi: <http://dx.doi.org/10.1175/1520-0477-60.2.115>

### **Lesson: FFMP and Issuing Basin-Based Flash Flood Warnings (Flash Flood Warning Best Practices, Part 1)**

#### References

Battan, L. J., 1973: *Radar Observation of the Atmosphere*. University of Chicago Press, 324 pp.

### **Lesson: How and When to Use “Flash Flood Emergency” Warnings (Flash Flood Warning Best Practices, Part 2)**

#### References

National Weather Service, 2011: Instruction 10-922: Weather Forecast Office Hydrologic Products Specification. November 8, 2011.  
<http://www.nws.noaa.gov/directives/sym/pd01009022curr.pdf>

### **Lesson: The Meteorology Behind Extreme Rain Events (Flash Flood Warning Best Practices, Part 3)**

#### References

Doswell, Charles A., Harold E. Brooks, Robert A. Maddox, 1996: Flash Flood Forecasting: An Ingredients-Based Methodology. *Wea. Forecasting*, **11**, 560–581.  
doi: [http://dx.doi.org/10.1175/1520-0434\(1996\)011<0560:FFFAIB>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1996)011<0560:FFFAIB>2.0.CO;2)

Funk, Theodore W., 1991: Forecasting Techniques Utilized by the Forecast Branch of the National Meteorological Center During a Major Convective Rainfall Event. *Wea. Forecasting*, **6**, 548–564.  
doi: [http://dx.doi.org/10.1175/1520-0434\(1991\)006<0548:FTUBTF>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1991)006<0548:FTUBTF>2.0.CO;2)

Gallus, William A., Nathan A. Snook, Elise V. Johnson, 2008: Spring and Summer Severe Weather Reports over the Midwest as a Function of Convective Mode: A Preliminary Study. *Wea. Forecasting*, **23**, 101–113.  
doi: <http://dx.doi.org/10.1175/2007WAF2006120.1>

Hershfield, D. M., 1961: Rainfall Frequency Atlas of the U.S. U.S. Government Printing Office, 65 pp.  
[http://www.nws.noaa.gov/oh/hdsc/PF\\_documents/TechnicalPaper\\_No40.pdf](http://www.nws.noaa.gov/oh/hdsc/PF_documents/TechnicalPaper_No40.pdf)

Junker, Norman W., Russell S. Schneider, Stephanie L. Fauver, 1999: A Study of Heavy Rainfall Events during the Great Midwest Flood of 1993. *Wea. Forecasting*, **14**, 701–712.  
doi: [http://dx.doi.org/10.1175/1520-0434\(1999\)014<0701:ASOHRE>2.0.CO;2](http://dx.doi.org/10.1175/1520-0434(1999)014<0701:ASOHRE>2.0.CO;2)

Maddox, R. A., C. F. Chappell, L. R. Hoxit, 1979: Synoptic and Meso- $\alpha$  Scale Aspects of Flash Flood Events<sup>1</sup>. *Bull. Amer. Meteor. Soc.*, **60**, 115–123.  
doi: <http://dx.doi.org/10.1175/1520-0477-60.2.115>

Ralph, F. Martin, Paul J. Neiman, Richard Rotunno, 2005: Dropsonde Observations in Low-Level Jets over the Northeastern Pacific Ocean from CALJET-1998 and PACJET-2001: Mean Vertical-Profile and Atmospheric-River Characteristics. *Mon. Wea. Rev.*, **133**, 889–910.  
doi: <http://dx.doi.org/10.1175/MWR2896.1>

Schumacher, Russ S., Richard H. Johnson, 2005: Organization and Environmental Properties of Extreme-Rain-Producing Mesoscale Convective Systems. *Mon. Wea. Rev.*, **133**, 961–976.  
doi: <http://dx.doi.org/10.1175/MWR2899.1>